What Is Claimed Is:

1. A system for controlling an output of a fuel cell, said system comprising:

a controller;

a fuel cell in communication with said controller;

an energy storage device directly paralleled to said fuel cell; and

wherein said controller controls an output voltage of said fuel cell and an output voltage of said energy storage device.

2. The system as claimed in claim 1 wherein said controller further comprises logic for controlling said fuel cell voltage as a function of predetermined parameters and said energy storage device state of charge as a function of predetermined parameters.

3. The system as claimed in claim 2 wherein said predetermined parameters for said fuel cell voltage control further comprise at least one of a mass flow rate of fuel, a mass flow rate of air, a pressure of fuel, a pressure of air, a humidity of air, a humidity of hydrogen, a temperature of said fuel cell and a current drawn from said fuel cell; and

said predetermined parameters for said energy storage device voltage further comprise at least one of a state-of charge for said energy storage device, a current of said energy storage device, and an age of said energy storage device.

4. The system as claimed in claim 3 wherein said controller models, measures and controls a subset of said predetermined parameters for said fuel cell and said predetermined parameters of said energy storage device to control a state-of-charge of said energy storage device.

5. The system as claimed in claim 4 wherein said controller uses a load current to determine a demand load.

6. The system as claimed in claim 5 wherein said controller further comprises logic to modify a fuel cell voltage for dividing said load current into a first portion related to said energy storage device and a second portion related to said fuel cell.

7. The system as claimed in claim 1 wherein said energy storage device is a battery.

8. The system as claimed in claim 1 wherein said energy storage device is an ultracapacitor.

9. A method for controlling an output of a fuel cell system having a controller, a fuel cell in communication with the controller, an energy storage device directly paralleled to the fuel cell, and an external load, said method comprising the steps of:

determining a desired state of charge for said energy storage device;

measuring a load current;

modeling predetermined parameters of the fuel cell and the energy storage device based on said desired state of charge; and

controlling a state-of-charge for the energy storage device based on said predetermined parameter models.

10. The method as claimed in claim 9 wherein said step of modeling predetermined parameters further comprises:

modeling at least one of a mass flow rate of air, a mass flow rate of fuel, a pressure of air, a pressure of fuel, a temperature of said fuel cell, a humidity of air, a humidity of hydrogen, and a fuel cell current for the fuel cell; and

modeling at least one of a state of charge, a current, a temperature and an age of the energy storage device.

11. The method as claimed in claim 10 wherein said step of controlling a state of charge for the energy storage device further comprises coordinating voltage-current characteristics for the energy storage device with voltage-current characteristics for the fuel cell.

12. The method as claimed in claim 11 wherein said step of coordinating voltage-current characteristics for the energy storage device and the fuel cell further comprises the steps of:

determining a first operating point for a detected state of charge defined by the intersection of the voltage-current characteristic for the fuel cell and the voltage-current characteristic of the energy storage device;

determining a final operating point for a desired state of charge; and

modifying the predetermined parameters to adjust the detected state of charge to the desired state of charge.

13. The method as claimed in claim 12 further comprising the step of dividing said load current to define a first portion relative to said fuel cell and a second portion relative to said energy storage device, wherein the load current is being served by both the energy storage device and the fuel cell and wherein at a 100% state of charge for said energy storage device, the load current is supplied entirely by the fuel cell.

14. A method of controlling the state of charge for an energy storage device in a system having a fuel cell in communication with a controller and directly paralleled to an energy storage device and an external load, said method comprising the steps of:

determining a current state of charge for the energy storage device;

determining a desired state of charge for the energy storage device;

modeling predetermined parameters of the fuel cell;

modeling predetermined parameters of the energy storage device;

controlling a voltage of the fuel cell based on the predetermined parameter models, whereby the fuel cell voltage is used to adjust the current state of charge to the desired state of charge for the energy storage device.

15. The method as claimed in claim 14 wherein said step of modeling predetermined parameters of the fuel cell further comprises modeling at least one of a mass flow rate of air, a mass flow rate of fuel, a pressure of air, a pressure of fuel, a temperature of said fuel cell, a humidity of air, a humidity of hydrogen, and a fuel cell current; and

said step of modeling predetermined parameters of the energy storage device further comprises modeling at least one of a state of charge, a current, a temperature and an age.

16. The method as claimed in claim 15 further comprising the step of dividing the load current between the fuel cell and the energy storage device based on the state of charge for the energy storage device.

17. The method as claimed in claim 16 wherein said step of dividing the load current further comprises, at 100% state of charge, the load current is supplied entirely by the fuel cell.